Discussion Paper No. 46

A MACROSOCIOLOGICAL ANALYSIS OF NATIVE INDIAN FERTILITY IN CANADA: 1961, 1971 and 1981

By

Frank Trovato

Department of Sociology
The University of Alberta
Edmonton, Alberta
T6E 2H4

September 1986

A MACROSOCIOLOGICAL ANALYSIS OF NATIVE INDIAN FERTILITY IN CANADA: 1961, 1971 AND 1981

A B S T R A C T

This study examines availiable data on one of Canada's leading Aboriginal groups, Native Indians. Five hypotheses are evaluated concerning their fertility trends over time and differences with respect to Others in Canada: (1) the modernity thesis of fertility decline; (2) the fertility-enhancing effect of modernization thesis; (3) the characteristics-assimilation hypothesis; (4) the pronatalist subculture explanation; and (5) the minority status-insecurities effect. Results from descriptive and multivariate analyses provide strong support for the first four hypotheses, but no support for the insecurities effect. In substantive terms, the findings suggest that while modernization generally implies long term declines in Native Indian fertility, their above average levels of reproduction are likely to persist for some considerable length of time, mostly as a function of the pronatalist subculture of Natives and the discontinuous nature of the modernization process.

A MACROSOCIOLOGICAL ANALYSIS OF NATIVE INDIAN FERTILITY IN CANADA: 1961, 1971 AND 1981

INTRODUCTION

The Aboriginal population of Canada maintains levels of reproduction that are typical of developing countries in their initial stages of demographic transition. According to recent assessments of this subgroup's fertility trends, their crude birth rate in 1960 was 47 per 1000 population, declining to 28 per 1000 by 1981 -- a rate that is twice the national level (Romaniuc 1985; 1984; 1981). This evidence suggests that the Natives' fertility transition is underway and in the future they will eventually assimilate the childbearing patterns of advanced societies.

In this study, the main concern is to use available data on Canadian Natives to test a series of hypotheses concerning their pattern of fertility decline since 1961 and the persisting differential in completed family size in relation to Other women in Canada. The available evidence concerning indigenous peoples in both Canada and the United States suggests that their demographic and epidemiolgical transitions have produced a variety of similar experiences among these two nations's Aboriginal tribes. Some of these patterns involve profound alterations such as the erosion of the extended family, increased risk of mortality from man-made causes such as alcoholism, accidents, suicide, and exposure to life stresses associated with rapid social change (Broudy and May 1983; Kunitz 1981). Thus, declines in reproductive levels among indigenous populations are occurring concomitantly with a host of other responses that emanate from the general process of modernization. A complete account and understanding of fertility change among Indians requires that social, epidemiologic and demographic factors be taken into account whenever possible. While this fact is well recognized, the main thrust of this paper is on one

important aspect of social demographic change, Canadian Indians' fertility transition.

HYPOTHESES

The Modernity Thesis of Fertility Decline

The demographic transition model explains changes in vital rates in the context of changes in a society's level of social an economic development.[1] As nations attain increased levels of modernization,[2] mortality and fertility begin to decline; and in most instances, declines in death rates precede large scale fertility declines (Davis 1945; Notestein 1944; Thompson 1929).

An implicit assumption of the transition model is that incipient declines in marital fertility are a rational response to new economic opportunities during the course of industrialization and modernization. Davis (1963) has explicated the motivational bases of this phenomenon. He maintains that when societies reach a stage of development characterized by sustained rates of natural increase (due to rapidly declining mortality and high fertility), and increasing industrialization, people will utilize the most feasible means of fertility control available to curtail their family size in order to maintain their current standard of living and to assure themselves access to existing economic opportunities. This explanation of demographic change and response falls in the domain of "adjustment" as opposed to "innovation" theories of Western Europe's historical path toward modernization and fertility transition (Carlson 1966; Knodel 1977). Adjustment theorists assume that modernization, as well as demographic factors, determine the onset of sustained declines in marital fertility primarily as a function of rising material aspirations which are incompatible with norms emphasizing large families. The onset of fertility transition emanates from the pervasive forces of economic rationality and

individualism; it represents a break from the traditional past when large families were viewed as advantageous to the well-being of the household.

The innovation argument also considers modernity and socioeconomic development as the main pinnacles of a society's fertility transition. In contrast to adjustment advocates, however, the adoption of efficient family limitation methods is considered to be a new discovery not present prior to industrialization. Adjustment theorists, on the other hand, contend that regardless of their level of development, societies always possess some forms of fertility control which range from infanticide and abortion to postponement of marriage and celibacy; and such means are usually adopted on a large scale when the conditions explicated by Davis prevail (Bulato and Lee 1983; Hajnal 1965; Hawthorn 1970; Potts and Selman 1978).

A rigorous test of these two theories in the context of Canadian Indians is not possible at this time because the necessary data are not available. We will confine ourselves to evaluating the thesis that modernization leads to a reduction in fertility since the underlying mechanisms for such an outcome among Canada's Indians probably entail features that encompass both adjustment and innovation processes.

A suitable operationalization of the modernity thesis of reproductive declines may be posed in the context of temporal effects on fertility. A modernization effect may be operationalized in a multivariate analysis as an inverse first order interaction term of time period with ethnicity while controlling for relevant main effects such as age, residence, and ethnicity. Consistent with the modernity thesis, Native Indians are predicted to show significant declines in their completed family size in relation to Other women in Canada. The assumed underlying mechanisms for this effect are posited to be manifestations of the fertility inhibiting impacts of modernization. Some of

the more relevant factors in this process include increased adoption of efficient birth control, a wider spacing of births, and later timing of first birth (Romaniuc 1974; Rosen and La Raia 1972).

The Fertility-Enhancing Effect Of Modernization Thesis

Evidence from historical populations and from the developing world suggests that the early stage of modernization may actually enhance the reproductive levels of societies (Romaniuc 1981; Dyson and Murphy 1985; Singh, Casterline and Cleland 1985). This prediction runs counter to the explanation that fertility always declines with modernization. In contrast to the previous hypothesis, it assumes that the process of modernization follows innumnerable discontinuities thus challenging the unlinear evolutionary view (Bardis 1962) that the effect of industrialization and modernity must always lead to continuous reductions in fertility.[3]

Two major fallacies associated with the evolutionary view of modernity are that old traditions somehow become immediately displaced by new changes, and that the modernization process always weakens traditions (Gusfield 1967).[4] In fact, much of the demographic evidence which is being amassed demonstrates the refutability of these assertions (Broudy and May 1983; Dyson and Murphy 1985). The evolutionary school of modernization and fertility implicitly accepts the premise that with modernization the society abandons old ways and readily adopts new modes of behaviour (Hoogvelt 1976). The discontinuity school, on the other hand, would emphasize the irregular nature of modernization where "individuals may be modern in one sphere, and traditional in another" (Schnaiberg 1970).

In the case of reproduction, this view is consistent with the recent demographic literature on transitional societies experiencing pretransition periods of enhanced fertility levels (Dyson and Murphy 1985; Trent 1985). The mechanisms responsible for this effect during the early stages of modernization

are varied, but the most common are associated with general improvements in health and nutrition, sanitation, disease control and mortality declines on the one hand, and a general resistance to widespread acceptance of modern birth control methods on the other. The juxtaposition of such changes ultimately enhances the reproductive capacity of the population. As life expectancy improves, and sterility-inducing diseases are readily controlled, while traditional norms about family size prevail, the overall result will be a temporary gain in fertility rates which could last several decades until widespread birth control is fully accepted and low fertility norms are adopted throughout all segments of the population.[5]

The fertility-enhancing effect of modernization hypothesis predicts that Native Indians will demonstrate a rise in their fertility levels because they are currently undergoing the transitional stages of modernization. In the ideal case, one would operationalize this prediction by relying on data concerning birth spacing, infant-feeding practices, use of birth control methods, changes in nutrition and health; and prevalence and incidence of sterility-inducing diseases, to determine their relative contribution to reproductive levels over the course of modernization.

Given the unavailability of such direct data, an appropriate operationalization of the hypothesis is to observe the impact of an interaction term on fertility involving time with age and ethnicity. That is, in a multivariate analysis, the interaction effect of time-age-ethnicity should emerge as positive, denoting that over time, Natives' age-specific fertility increases vis-a-vis Others in Canada. This operationalization further requires that the main effects of ethnicity, age, and period are entered in a multivariate equation along with all other relevant terms in the model. Age is included in the interaction term because with modernization the age pattern of

fertility has been observed, across a variety of populations (Coale and Trussel 1974; Knodel 1977), to undergo change in both level and shape. Thus, time and age are assumed, in the present case, to interact differently among Indians and Others.

The Characteristics-Assimilation Hypothesis of Fertility

In the process of social and economic transition, subgroups demonstrate a general tendency toward convergence of their reproductive and socioeconomic levels. Accordingly, observed differentials in childbearing are assumed to be temporary phenomena. Once modernity diffuses throughout society, groups will assimilate and fertility rates will converge (Abu-Lughod 1964; Goldscheider and Uhlenberg 1969; Petersen 1975).

The characteristics-assimilation thesis is an extension of the modernity theory of fertility decline. Just as societies undergo modernization and demographic transition, subgroups within nations, such as ethnic and racial minorities, will eventually follow in the modernizing experience of the total society (Bean and Friesbie 1978; Bean and Swicegood 1985; Johnson 1979; Rindfus 1980). The Indians of Canada are now in the formative stages of this transition and a general process toward convergence prevails: the age pattern of childbearing has declined, more Aboriginals are becoming educated beyond primary and secondary school levels; substantial rural to urban migration is common; there has been a general shift from a semi-nomadic life to one of permanent urban settlement, or relocation in reservations at the fringes of large cities; living conditions have improved; and substantial declines in infant mortality have been recorded, from 200 per 1000 births around World War Two, to 30 per one-thousand in the early seventies. The social setting for Natives is such that sustained declines in fertility are expected (Romaniuc 1985). From the point of view of the characteristics-assimilation hypothesis, the prediction is

that the Natives-Other fertility differential will disappear once discrepancies in socioeconomic variables are taken into account.

Usually, authors standardize for social demographic factors as a way of ascertaining the impact of assimilation with respect to variables such as age, urban-rural residence, income, education and other such compositional measures, and then proceed to observe whether differences in fertility disappear once statistical equalization on these measures has been applied. A similar approach will be followed in this study. If an ethnic main effect persists, once characteristics differences are held constant, substantive explanations for fertility differentials must rely on other factors beyond measures of social demographic discrepancies included in the statistical model.

The Minority Status Hypothesis and the Subcultural Normative Thesis

According to Goldscheider and Uhlenberg (1969), characteristics inequalities seldom explain all of the fertility differences observed among ethnic and racial minorities. Prior to Goldscheider and Uhlenberg's formualtion of the minority status hypothesis, most demographers and sociologists assumed that the fertility levels of deprived ethnic minorities were totally determined by either norms about family size (e.g., Catholics) or a culture lag in their assimilation to the larger society (e.g., blacks). A series of studies during the seventies and early 1980s have confirmed the Goldscheider-Uhlenberg assertion (Jiobu and Marshall 1977; Johnson 1979; Johnson and Lean 1985; Kennedy 1973; Roberts and Lee 1974; Rindfuss 1980; Bean and Marcum 1978; Bean and Swicegood 1985; Sly 1970; Trovato and Burch 1980; Trovato 1981). Such studies usually attribute the above average fertility of minorities to differences in three causal components: assimilation, subcultural norms, and minority-status insecurities.

The minority-status insecurities hypothesis is a variant of the adjustment theory proposed by Davis (1963); it posits that under certain conditions, the social psychological insecurities associated with upward mobility induce minority couples to consciously limit their family size below that of upwardly mobile members of the majority group. This effect has been observed to occur when minority members desire and strive for structural assimilation (Gordon 1964), and the group does not possess a unique ideology that emphasizes large families, nor does it possess strong normative beliefs against the use of modern means of birth control (Goldscheider and Uhlenberg 1969).

In the past, some politically disadvantaged minorities such as Catholics in Quebec and in other parts of the world (e.g., Ireland; Netherlands), embraced the pronatalist ideology of the Catholic Church because large families would ultimately enhance the political strength of the group (Burch 1966; Day 1968; Goldscheider 1971; Kennedy 1973; Van Heek 1951). Recently it has been discovered that young Catholic couples, have practically abandoned this particularized orientation, and their fertility rates are consistently low or below average (Balakrishnan, Ebanks and Grindstaff 1979; Jones and Westoff 1979; Henripin and La Pierre-Adamcyk 1974; Romaniuc 1984).

Whether Canadian Indians, and Aboriginals in general, possess a particularized ideology for large families (i.e., a unique set of pronatalist subcultural norms), is open to speculation and empirical verification (Trovato 1981). In accordance with social demographic explanations of transitional societies, it follows that given this group's deprived social, economic, and historical experience (e.g., decimation due to the white man's domination and diseases imported to the New World), Natives would have developed strong familistic norms as an adaptive strategy for group survival. According to the early theorists of demographic transition (e.g., Davis 1945; Notestein 1949;

Thompson 1929), and the more recent reformulations of the transition model (i.e., Coale 1974; Caldwell 1982), societies in the pretransition stages are characterized by pronatalist institutional structures which are in essence manifestations of survivalist strategies in environments characterized by high mortality rates, widespread disease, famine and poor socioeconomic conditions. The Aboriginals of Canada are known to exemplify these conditions historically (Lieberson 1966). The expectation is that even in the contemporary context their subculture still embraces strong pronatalist norms.

The minority-status insecurity and the subcultural pronatalist hypotheses are usually operationalized by relying on statistical procedures because direct measures for psychological insecurity are not commonly available in secondary data sources (Lopez and Sabagh 1978). A common approach is to operationalize first order interaction effects of socioeconomic variables with ethnicity (or minority membership) as denoting an insecurities phenomenon (Jiobu and Marshal 1978; Johnson 1979). The assumption is that with advanced levels of upward mobility minority group couples will consciously limit their fertility vis-a-vis the majority couples at similar levels of socioeconomic attainment, due to social psychological insecurities associated with minority status. In a multivariate analysis, a negative regression coefficient for such an interaction term would be interpreted in support of the hypothesis. In the present study the insecurities effect will be measured by the interaction of ethnicity (Native Indian as a dummy variable) with residence type because no other compositional variables that could serve as proxies for socioeconomic attainment are available in our data set. Unfortunately, the lack of more characteristics variables places an important restriction on providing a more comprehensive test of the minority status hypothesis.

Residence is used as a proxy for socioeconomic improvements among Natives because in general, urban society, as opposed to rural life, provides individuals greater access to economic opportunities and upward mobility. This view assumes that the movement from rural to urban areas constitutes a general improvement in the opportunity structure of Native Indians. This may be a debatable assumption given the Natives' experience of discrimination and prejudice in urban Canada. However, it can be argued that for rural to urban migrants there is the perception, if not the reality, that somehow their condition will improve or become better in the city as opposed to the rural areas. To the degree that Natives in urban areas perceive that their condition is improving or that it will somehow change for the better, the greater their insecurities about having large families and they will consciously limit their fertility.

A subcultural normative component is operationalized as a significant ethnic main effect. Support for the pronatalist thesis will be obtained if the Native Indian ethnicity term persists in being positive and statistically significant when all other relevant main and interaction terms are held constant simultaneously.

DATA ISSUES

Statistics concerning the Natives of Canada are not without complications. First, it is important to recognize that Aboriginal as an ethnic classification encompasses several Native groups such as Inuit, Status Indians, Non-status Indians, and Metis. Aboriginals in Canada constitute approximately half a million people, with Indians comprising 75 percent of the total Aboriginal population (Romaniuc 1985). Systematic historical data for each of these subgroups is not available and much of the existing demographic data

concerning fertility and mortality of Indians have been estimated using indirect methods (e.g., Piche and George 1973; Romaniuc 1981). In recent years, concerted efforts have been made to collect reliable demographic information on Status Indians because they are under the jurisdiction of the Canadian Government. Much of the information concerning the other elements of the Aboriginal population is derived from decennial censuses of Canada's population. Beginning with the 1971 census, Statistics Canada has produced micro public use sample tapes which include Aboriginal respondents. However, while it is possible to identify the different designations of Aboriginals in the 1981 census, this is not possible with the 1971 data tapes because all the various Aboriginal categories were all grouped under the designation "Native Indians." For 1961, no census tapes exist, therefore, detailed analyses of each subgroup's fertility trends can only be executed with the 1981 data tapes, which unfortunately are not readily accessible by the general public. The released user tapes from the latest census do not contain any data on Aboriginals.

The Native Indians (status and non-status combined) data were originally collected by the censuses of 1961, 1971 and 1981 and appear in Romaniuc (1985). The information concerning Other Canadian women comes from published Statistics Canada Census tabulations. For the purposes of this study, a multiway table was constructed involving average children ever born per 1000 ever married women broken down by age, residence, census period and ethnicity.[6]

METHODS OF ANALYSIS

Since the dependent variable is a continuous measure, multiple regression is an appropriate statistical methodology to evaluate our hypotheses. A dummy independent variable was created for ethnicity (Status and Non-status Indian = 1; Other = 0). Residence is coded as rural = 1; rural non-farm = 2; urban = 3.

Period is measured as 1961 = 1; 1971 = 2 and 1981 = 3. Age consists of twelve five-year categories (15-19 = 1; ...; 70+ = 12). Interaction terms reflecting the hypotheses elaborated earlier were created in accordance with these coding specifications. Table 1 summarizes the research hypotheses and associated operationalizations.

An initial concern was to evaluate whether the Natives' data conform to the expected age pattern of children ever born, which should be generally linear from age 15 to approximately age 44. The data corresponding to Indians have already been checked for possible errors by Romaniuc (1985). Nevertheless, a series of precautionary tests were undertaken to assess possibility of severe irregularities in the period-residence-age specific patterns of fertility among both Natives and Other women in Canada. A number of graphic representations confirmed that the data do not deviate significantly from expectation, and therefore, adjustments were deemed unnecessary (graphs available on request).[7]

DESCRIPTIVE ANALYSIS

Table 2 presents average children ever born per 1000 ever married women by ethnicity and time period. Although the Natives' fertility has been declining, their average family size has always exceeded the levels associated with Other women. The differential has varied from an excess of 1.71 children in 1961, to 1.82 in 1971, and 1.65 in 1981, respectively. Over the twenty-year study period, the overall average excess in favour of Natives is 1.73 children. It is interesting to note that between 1961 and 1971 the fertility differential actually increased by .10 of a child, while in 1981, there was a decline in the Native-Other differential by .17 of a child. This preliminary evidence, although inconclusive at this stage of the analysis, is consistent with the postulates of the fertility-enhancing effects of modernization thesis.

TABLE 1. HYPOTHESES AND OPERATIONALIZATIONS.

Hypothesis	Prediction	Operationalization
1. Modernity thesis of fertility decline	Fertility of Native Indians declines over time due to the fertility-inhibiting effects of modernization.	In multiple regression: the interaction of ethnicity with time will have a negative influence on children ever born among Native Indians.
2. The fertility-enhancing effect of modernization	Native Indians are undergoing modernization; therefore, they will experience temporary gains in their reproductive levels due to a series of fertility-enhancing mechanisms such as shorter birth intervals as a consequence of abandoning breast-feeding practices, while widespread adoption of modern contraception lags behind.	In multiple regression: the interaction of ethnicity-time-age will show a positive effect on children ever born among Native Indians.
3. Characteristics-Assimilation Hypothesis	The observed higher fertility on Native Indians in comparison to other women in Canada is due to Natives' deprived status with respect to social demographic variables such as income, education, occupation, residence, etc. Equalization of these discrepancies leads to a convergence in fertility.	In multiple regression: the positive main effect of ethnicity (Natives) on children evern born will disappear or become insignificant once social demographic variables are simultaneously controlled for.
4. Pronatalist subculture thesis	Ethnicity per se will have a positive main effect on children ever born to Indian women even after relevant social demographic variables are held constant because it reflects the pronatalist norms of Natives. taken into account.	In multiple regression: the main effect of ethnicity (Natives) on children ever born will be positive and statistically significant even after all other main and interaction effects in the equation are taken into account.

5. Minority-status insecurities thesis	The interaction effect of minority status with upward mobility causes social psychological insecurities leading minority couples to consciously curtail their family size below the level of majority group couples at similar stages of socioeconomic advancement.	In multiple regression: the interaction effect of ethnicity (Natives) with residence on children ever born will be negative even after all main and interaction terms in the equation are taken into account.

TABLE 2. AVERAGE CHLDREN EVER BORN PER 1000 WOMEN, BY ETHNICITY AND TIME PERIOD.

	PERIOD			
Ethnicity	1961	1971	1981	x
Native Indians	5.04 (1.8)	4.92 (1.9)	4.43 (2.2)	4.80 (1.9)
Others	3.33 (1.3)	3.10 (1.3)	2.78 (1.3)	3.07 (1.3)
Difference (Natives-Others)	1.71	1.82	1.65	1.73

NOTE: Standard Deviations in Parentheses.

Table 3 exhibits data on children ever born broken down by residence and census period. Although differences between Native Indians and Others are not explicitly shown in the table, it is clear that substantial discrepancies are noticeable regardless of type of residence and period. Across all three residence categories, Natives have experienced a relative reduction in their pace of fertility decline between 1961 and 1971. In the rural sector, the excess average number of children ever born among Natives in 1961 was 1.52; it changed to 1.75 in 1971, and then declined to 1.49 in 1981. A similar trend is evident in the urban areas as well: The 1961 difference of 1.71 changed to 1.82 in 1971, declining to 1.68 in 1981. In the rural non-farm places there is indication that since 1971, there has been a resistance to a decline of this differential. For example, Indians had on the average an excess of 1.75 children in 1961, increasing it to 2.16 in 1971; and in 1981, this difference remained unchanged. Perhaps the rural non-farm sector reflects the Natives' predominant preferences for settlements in reservations located mostly in the rural non-farm areas of Canada. In such localities, traditions and norms about family and reproduction tend to be reinforced and are generally more resistant to the forces of social change (Trovato and Grindstaff 1980). Further support for this inerpretation is gained when examining their relative advantage in current family size across the three residence types. In the rural areas the average differential is computed to be 1.58 while in rural non-farm places (assumed to be mostly reservation settlements), this is 2.02. Urban centres show an intermediate difference of 1.73 children in favour of Indians.

Table 4 demonstrates the average number of children ever born to Native and Other women classified by broad age groups and time period. The age groups were coded in ten year classes in order to better present changes among cohorts as they proceed through their reproductive ages over the three census periods.

TABLE 3. AVERAGE NUMBER OF CHILDREN EVER BORN PER 1000 WOMEN, BY ETHNICITY, TIME PERIOD AND RESIDENCE.

Ethnicity and Residence	PERIOD		
	1961	1971	1981
NATIVE INDIANS			
Rural Farm	5.36 (1.8)	5.24 (1.9)	4.60 (2.2)
Rural Non Farm	5.31 (1.8)	5.52 (2.03)	5.13 (2.3)
Urban	4.43 (1.6)	4.00 (1.55)	3.60 (1.7)
TOTAL	5.04 (1.8)	4.92 (1.9)	4.43 (2.2)
OTHERS			
Rural Farm	3.84 (1.5)	3.49 (1.4)	3.11 (1.3)
Rural Non Farm	3.56 (1.2)	3.36 (1.3)	2.97 (1.4)
Urban	2.60 (.9)	2.46 (.9)	2.28 (1.0)
TOTAL	3.33 (1.3)	3.10 (1.3)	2.78 (1.3)

NOTE: Standard deviations in parentheses.

TABLE 4. AVERAGE CHIILDREN EVER BORN PER 1000 WOMEN, BY AGE AND PERIOD, NATIVE INDIANS AND OTHERS IN CANADA.

Ethnicity and Age	PERIOD		
	1961	1971	1981
NATIVE INDIANS			
15-24	1.768	1.528	1.145
25-34	4.300	4.000	2.778
35-44	6.083	5.743	4.325
OTHERS			
15-24	1.118	.890	.680
25-34	2.828	2.502	1.823
35-44	3.693	3.758	2.888
DIFFERENCE: INDIANS-OTHERS			
15-24	.650	.638	.465
25-34	1.472	1.498	.955
35-44	2.390	1.985	1.464

Assuming that reproduction stops at age 44, we have complete longitudinal information only for the age cohort 15-24 starting in 1961. As well, we have only a partial picture for the 15-24 cohort beginning in 1971. These data show that young Indian women going through their reproductive span continue to surpass Other women by at least half a child on the average. However, among recent cohorts in their early phase of childbearing there is a definite tendency toward a narrowing of this differential, from .650 in 1961 to .465 in 1981. In relation to their Other counterparts, Indian females aged 15-24 in 1961, who went on to complete their family sizes in 1981, started with a .65 of a child difference in their favour, and resulted finally with a 1.464 excess differential. Thus, while there is only a half child difference in the early years of family formation, by the end of the reproductive cycle, this discrepancy is raised to approximately 1.5 children. The indication from the 15-24 cohort in 1971 as it proceeded to becoming 25-34 in 1981, is that the average family size differential with respect to Other Canadians does not exceed one child, suggesting perhaps that the more recent Indian cohorts may be consciously adopting family limitation means to a greater degree than their previous generations.

MULTIVARIATE ANALYSIS

Although there are substantial differences in average family size between Native Indians and Other women, a multivariate analysis is necessary to determine the relative impact of independent variables on fertility, and to allow for an efficient assessment of hypotheses.

Zero order correlations of predictor variables with children ever born, and three regression analyses involving main and interaction terms are displayed in Table 5. The first equation includes only main effects thus allowing us to

detect their contribution to the overall variance explained (R^2 = .861), as well as determine their impact on the dependent variable. All main effects are in the expected direction: the ethnic variable is positive and quite pronounced; age is linearly related to fertility, while both time and residence are inversely associated with children ever born.

The modernization thesis posits that the interaction effect of ethnicity with period serves to lower the fertility of Native Indians with respect to Other women in Canada. The effects in equation two concerning the interaction of period with ethnicity indicate that, as predicted, Native Indians have reduced their fertility since the early part of the 1960s.

The characteristics-assimilation hypothesis predicts that when controlling for compositional variables, the main effect of ethnicity will disappear or become statistically insignificant. Judging from equations two and three, this outcome fails to materialize. The effect of being Indian as opposed to Other persists to exert a positive main effect on fertility even after all other main and interaction terms in the equation are taken into account. In substantive terms this suggests that equalization of age, residence and the interactive measures, would fail to eliminate the difference in childbearing between Natives and Others. While this evidence supports the normative-subcultural effect hypothesized eariler, a complete assessment of the ethnic effect requires to computation of partial derivatives for the fertility differential with respect to ethnicity. Whenever interaction effects are included in a regression model, the relevant main effects are not directly interpretable unless derivatives are computed (Stolzenberg 1980). The derivatives for the ethnic effects will be discussed later in connection with Tables 6 and 7.

The minority-group status insecurities hypothesis calls for an interaction of ethnicity with characteristics variables. The effect is expected to contribute to a reduction of fertility among Natives vis-a-vis non-Natives. The first order interaction term involving ethnicity with residence was included in the equation to operationalize this hypothesis. The coefficient in equation two is in the expected direction, yet it fails to reach statistical significance. This implies that Natives in urban places may experience feelings of insecurity, but the impact is of no substantive relevance in lowering their overall fertility levels. The ethnic-age interaction term fails to show a significant influence on fertility. Both these insignificant terms were deleted and a new regression equation was computed, shown as equation three in Table 5.

The interaction term at the bottom of equation three involving ethnicity with age and period, may be interpreted as support for the modernity-fertility enhancement thesis. The essence of the argument underlying this prediction is that during the transitional stages of modernization deprived groups experience increased levels of reproduction due to the abandonment of certain traditional ways (e.g., breastfeeding), the concomitant reception of certain new modes of behavior (e.g., bottlefeeding), and the general resistance (lag) in the acceptance of certain new technologies such as modern means of birth control.

A related mechanism contributing to increased fertility during initial stages of modernization is the relaxation of certain customs and conditions governing pretransition behaviors. As the society shifts from a predominantly nomadic to a sedentary way of life, there are significant improvements in the quality of life, such as gains in life expectancy, fewer infant deaths, and fewer risks to pregnant mothers, thus diminishing the involuntary termination of pregnancies due to accidents.

TABLE 5. MULTIPLE REGRESSION ANALYSIS OF CHILDREN EVER BORN.

Variables	Correlation with CEB	EQUATIONS (1) b	(1) B	(2) b	(2) B	(3) b	(3) B
Ethnicity (.50;.501)	.46	1.7196	.463*	1.2787*	.344*	1.7805	.479*
Age (5.25;2.13)	.76	.6646	.761*	.5243*	.600*	.5371	.615*
Time (2.0;.818)	-.13	-.2894	-.127*	-.2742*	-.121*	-.2742	-.121*
Residence (2.0;.818)	-.23	-.5284	-.232*	-.5201*	-.229*	-.5284	-.232*
Ethnicity x Age (2.63;3.03)	.73			.1019	.166		
Ethnicity x Time (1.00;1.16)	.35			-.4992*	-.310*	-.6997	-.435*
Ethnicity x Residence (1.0;1.16)	.32			-.0165	-.0101		
Ethnicity x Time x Age (5.25;6.89)	.61			.0893*	.331*	.1275	.472*
CONSTANT		1.220		1.909		1.859	
R^2		.864		.893		.892	
R^2 Adj.		.861		.889		.889	
F-Regression		333.78		215.61		287.65	
d.f.		4/211		8/207		6/209	

Means; standard deviations in parentheses.
The mean for CEB is 3.933, and the standard deviation is 1.861.
Refer to text for explanation of coding procedures.

* t significant at $\leq$ .05 level.

Also, the movement from nomadism to sedentism engender improvements in communication and technology minimizing the necessity for spouses to be separated over long periods of time for the purpose of hunting and food production. Temporary separation of spouses is viewed by Davis and Blake (1956) as an important intermediate variable affecting fertility. To the extent that prolonged separation diminishes, fertility will likely increase.

In his 1968 study of James Bay Indians, Romaniuc (1974) found evidence supporting all the above phenomena. It was discovered that in addition to significant reductions in pregnancy wastage, a decline in lactation and reduced tendencies for prolonged conjugal separations, another important factor contributing to shorter birth intervals, was a significant reduction in the incidence of abnormal postpartum sterility and venereal diseases which generally cause infertility. Such developments translate into increased fertility through a reduction in childlessness on the one hand, and a longer span in the ability to reproduce on the other (due to the eradication of fertility-inhibiting diseases and general improvements in health and nutrition).

Although our data cannot provide direct measurement of these effects, our operationalizations lead to the conclusion that a significant factor in the Natives' fertility transition works in the opposite direction as would be expected from a simple observation of their overall trend over time. Our hypothesis is that this counterveiling effect is largely a reflection of the discontinuous nature of modernization. Though the overall pattern since the early sixties is one of substantial and continuing declines in reproductive levels, certain components of the modernization process serve to enhance the reproductive capacity of the group.

Of course, this anomaly will eventually disappear. Over the years Native Indians have been adjusting to many of the changes accompanying modernity.

Eventually, the temporary phenomenon of rising fertility level will become overshadowed by the forces of social change. Their overall long term declines in fertility suggest that Natives are increasingly adopting the attitudes and life styles of the larger society, including values for small families and the conscious planning, timing and spacing of their families. They are increasingly adopting a modern fertility pattern characterized by nearly universal parenthood,[8] relatively early ages at childbearing, very small families, and the dominance of timing shifts over number shifts in affecting fertility rates (Ryder 1969).

As an indication of such developments, Table 6 shows the partial derivatives for the effect of ethnicity on the fertility differential. First, when time and age are considered at their respective means, the partial effect of ethnicity persists in being positive and substantial, providing further support for the notion that Natives possess a pronatalist subculture. The remaining ethnic parameters have been computed at varying levels of age and time in order to observe how the effect of ethnic membership changes over different combinations of these two predictors. The results indicate that the effect of being Indian as opposed to Other increases over age within each time period. However, within the ages 15 to 39, the effect of ethnicity has been declining. For older women the opposite situation is true. Thus it seems that young Native women, while still reproducing above Others, are reducing their fertility. Each new generation of Indian females is increasingly moving toward the level of reproduction of Others in Canada. The gaining effects of Indian ethnicity among older women reflects the completed family size pattern of females who belong to earlier cohorts and thus are more traditional in orientation, as they were not exposed to the rapid social changes noted for the more recent generations. Thus, the older the age group, the larger the completed family size.

TABLE 6. THE EFFECT OF ETHNICITY (PARTIAL DERIVATIVES) AT SPECIFIED LEVELS OF TIME AND AGE ON CHILDREN EVER BORN.

AGE	TIME	$\frac{\partial y}{\partial x}$	$\left(\frac{\partial y}{\partial x} \times \frac{SD_x}{SD_y}\right)$ *
$\bar{x}$	$\bar{x}$	1.050	.280
1=15-19	1=1961	1.2083	.325
	2=1971	.6361	.171
	3=1981	.0639	.017
2=20-24	1	1.3358	.360
	2	.8911	.240
	3	.4464	.120
3=25-29	1	1.4633	.394
	2	1.1461	.309
	3	.8289	.223
4=30-34	1	1.5908	.428
	2	1.4011	.377
	3	1.2114	.326
5=35-39	1	1.7183	.463
	2	1.6561	.446
	3	1.5939	.429
6=40-44	1	1.8458	.497
	2	1.9111	.514
	3	1.9764	.532
7=45-49	1	1.9730	.531
	2	2.1661	.583
	3	2.3589	.635
8=50-54	1	2.1008	.566
	2	2.4211	.652
	3	2.7414	.738

* standardized effect.

Although a complete overview of fertility experience requires that we adopt a cohort mode of analysis, to follow the same group of females throughout their childbearing ages, the available data suggests that it is unlikely that young Indian cohorts will eventually bear as many children as their older counterparts. The situation in Table 7 shows that when standardized partial derivatives are arranged in an age-by-period fashion, the effect of progressing through age and time during the reproductive years, serves to enhance the effect of ethnicity. This means that as Indian women progress through their childbearing years, the difference with respect to Others in Canada tends to widen. Therefore, we see that ethnicity interacts with time and age in a complex fashion. While there is a reduction in fertility over time, and over age, separately, the joint experience of cohorts over time and age shows a widening differential in childbearing, an effect which is consistent with the fertility enhancing thesis of modernization discussed earlier.

The findings reported in Tables 6 and 7 have important bearing on the minority status and characteristics-assimilation hypotheses. Although we cannot provide a more fair test of these two theses, due to the limited number of predictors, particularly the lack of socioeconomic variables, our study represent an improvement over most evaluations of these two hypotheses in the existing literature. Rindfuss (1980), in his assessment of this issue contends that longitudinal or time series data is needed, as opposed to crossectional, to provide an adequate test of the minority status and characteristics hypotheses because the inherent issue concerning ethnic and minority group fertility is to uncover how changes in social economic conditions over time translate into fertility reductions for the group. Despite all the hypothesized relevance of change over time (e.g., Goldscheider and Uhlenberg 1969; Johnson 1979), the empirical tests have predominantly used only crossectional data at one point in

TABLE 7. STANDARDIZED ETHNIC EFFECTS (PARTIAL DERIVATIVES) ARRANGED IN AN AGE-BY-PERIOD FORMAT

	Period		
Age	1961	1971	1981
15-19	.325	.171	.017
20-24	.360	.240	.120
25-29	.394	.309	.223
30-34	.428	.377	.326
35-39	.463	.446	.429
40-44	.497	.514	.532

time. Thus authors have generally relied on indirect means to test for the effects of temporal change (e.g., regression standardization techniques). In the present study, this problem has been avoided by examining fertility change over three points in time, which in agreement with Rindfuss (1980), provides a more stringent test of the extent to which the minority is assimilating or resisting to assimilate the fertility pattern of the majority group. The overall results in this study suggest that Indians in Canada are demonstrating an assimilative pattern, but at the same instance persist in having family sizes significantly above Others. Therefore, we are led to conclude tentatively that there are still strong pronatalist forces inherent in this group which help to maintain high fertility, even in the face increasing modernization.

CONCLUSION

Available data have been utilized to test a number of hypotheses concerning the Native Indian - Other fertility differential in Canada during three census periods, 1961, 1971 and 1981. With only four variables in our data set, it was possible to operationalize five hypotheses: (1) the modernity thesis of fertility decline; (2) the modernity-enhancing effect on fertility explanation; (3) the characteristics-assimilation hypothesis; (4) the minority status insecurities thesis; and (5) the pronatalist subculture effect.

Results from descriptive and multivariate analyses provide strong support for all hypotheses except for the minority-insecurity effect. Some degree of caution is urged in drawing definite conclusions about the insecurity phenomenon due to the limited nature of the data. In particular, it is recommended that in the future a more comprehensive test of the minority status and characteristics hypotheses be undertaken once the appropriate data become available. Further work in uncovering the sociological and demographic sources of Natives and other

Aboriginals' fertility transition in Canada and the United States will require detailed case studies of specific tribes to complement macro level approaches. Of particular relevance would be the analysis of how proximate determinants change over the course of modernization, such as nuptiality, contraception, abortion, postpartum infecundability, and how they condition the Indians' fertility transition.

In substantive terms, our findings suggest that while modernization generally implies long-term declines in Native Indian fertility, their above average reproductive levels in relation to the rest of Canada are likely to persist for some time into the future. Native Indian subculture on the one hand, and the discontinuous nature of modernization, on the other, serve to enhance reproductive performance among this minority group, therefore slowing their pace of fertility decline to some degree.

FOOTNOTES

1. Quite often, demographers refer to the demographic transition as a theory. It is not a theory in the strict sense of the word, but it is a generalization that describes changes in vital rates for a society over a long time span. Therefore, the term "model" is used throughout in this paper. The demographer Dennis Wrong (1977, pp. 18-19) has identified five stages of the transition model, although in most cases, three stages are specified: (1) high birth rates-high death rates; (2) high birth rates-declining but high death rates; (3) high birth rates-fairly low death rates; (4) declining birth rates-fairly low birth rates; (5) low birth rates-low death rates. A related process, which occurs concomitantly with the demographic transition is the epidemiologic transition. According to Omran (1971:516), societies experiencing modernization progress through three stages, each associated with changing disease patterns which cause the society's majority of deaths: 1) the age of pestilence and famine; 2) the age of receding pandemics; 3) the age of degenerative and man-made diseases.

2. From the perspective of societies, the modernization process, that is, the movement from traditional to transitional society, involves several dimensions at the structural and personality levels. For example, at the structural level, the International Encyclopedia of the Social Sciences (Volume 10, page 387) lists five characteristic aspects of development (modernization): (1) a degree of self-sustaining growth in the economy ... sufficient to increase both production and consumption regularly; (2) a measure of public participation in the polity; (3) a diffusion of secular-rational norms and values in the culture; (4) an increment in personal, physical, and social and psychic mobility and freedom; (5) a corresponding transformation in the model personality that equips individuals to function effectively in a social order that operates according to the foregoing characteristics. Parson's (1968) interpretation of Durkheim and Weber led him to formulate the "pattern variables" that contrast modern versus traditional societies. For instance, positions in modern societies are chosen and achieved as opposed to ascribed and affirmed; truth of calculation and science in the modern society are superordinate to emotions, the sacred, and the non-rational; the primary unit of modern society is the individual rather than the group. Concerning the family institution, as society changes from traditional to modern, William Goode (1970) has identified two distinct ideologies which emerge with industrialization and modernity: (1) an ideology of independence from the extended family; (2) an ideology of equality between the sexes. Individual modernity has been studied by Inkeles and Smith (1974); they describe six dimensions of becoming modern: (1) openess to new experiences; (2) increasing independence from traditional authority figures and a shift of allegiance to public leaders; (3) a belief in the efficacy of science and medicine to solve human problems as opposed to a belief in non-ratioanl means such as magic and witchcraft; (4) the development of achievement and social mobility aspirations; (5) a strong desire to participate in civic life; (6) a strive to attain general as opposed to localized knowledge about social life and world events.

3. Unilinear evolutionary theories of social change explaining the movement of societies from traditional to modern may be exemplified by change following a straight line; that is, society advances from a primitive stage to a more advanced one. Bardis (1962) includes the thoeries of Hegel, Marx, Comte, Edward Taylor and Lewis Morgan in this general model of social change. Other theorists which may be classified in this typology are Durkheim (mechanistic vs. organic); Tonnies (Gessellschaft vs. Gemeinschaft); Redfield (folk-urban continuum).

4. According to Gusfield's seven fallacies are: (1) developing societies have been static societies; (2) traditional culture is a consistent body of norms and values; (3) traditional society is a homogeneous social structure; (4) old traditions are displaced by new changes; (5) traditional and modern forms are always in conflict; (6) tradition and modernity are mutually exclusive systems; (7) modernization processes weaken traditions.

5. A further example of the discontinuous nature of modernization is the culture lag phenomenon (Ogburn 1964). Often, transitional societies will accept innovations at varying speeds due to culture lag, engendering many unexpected consequences. For example, during the late sixties, the James Bay Indians of Canada began to adopt bottlefeeding practices for their infants, but there was no evidence of widespread acceptance of modern methods of birth control. The shift from breastfeeding to bottlefeeding thus resulted in a reduction of the women's postpartum infecundability intervals, increasing their overall fertility (Romaniuc 1974). In relation to life style, Brody and May (1983) discoverred that among Navajos in the United States the combination of new wealth which allows for the ability to buy new cars, and their culture which has not integrated safety practices appropriate for the new technology, has led to significant rises in accident related mortality.

6. It is important to realize that the data being analyzed are aggregate as opposed to individual micro data. The multiway table consists of 198 data lines (2 x 11 x 3 x 3 = 198), with each record representing a unique combination of the variable categories crossclassified simultaneously.

7. Preliminary regression analysis (available on request) confirmed that the age pattern of children ever born is linear once other variables are taken into account. The equation shows that if age 70+ is taken as the reference category, the age groups beyond 40-44 do not show statistically significant effects on children ever born.

8. Although this seems to be a predominant pattern, it is important to point out that for a considerable proportion of Indian females in Canada marriage has not been a precondition for procreation. A substantial number of first births to women occur out of wedlock or outside of formal marriage. Romaniuc (1985, p. 12) says that "For example, around 1970, about one-fourth of Indian women aged 20-29, and one-tenth aged 40-44 were unwed mothers. From the fragmentory data available the illegitimacy rates seem to have increased in recent years."

REFERENCES

Abu-Lughod, Janet. 1964. "Urban rural differences as a function of the demographic transition: Egyptian data and an analytical model." American Journal of Sociology 69:476-491.

Balakrishnan, T.R.; G.E. Ebanks and C.F. Grindstaff. 1979. Trends and Patterns of Fertility in Canada. Ottawa: Statistics Canada.

Bardis, Panos O. 1962. "Synopsis of theories of social change." Social Science 37:187-195.

Bean, Frank D. and W.P. Frisbie. 1978. The Demography of Racial and Ethnic Minorities. New York: Academic Press.

Bean, Frank D. and John P. Marcum. 1978. "Differential fertility and the minority group status hypothesis: An assessment and review." Pp. 189-211 in Frank D. Bean and W. Parker Frisbie (eds.), The Demography of Racial and Ethnic Minorities. New York: Academic Press.

Bean, Frank D. and Gray C. Swicegood. 1985. Mexican American Fertility Patterns. Houston, Texas: University of Texas Press.

Broudy, David W. and Philip A. May. 1983. "Demographic and epidemiologic transition among the Navajo Indians." Social Biology 30(1):1-16.

Bulatao, Rodolfo A. and Ronald D. Lee. 1983. Determinants of Fertility in Developing Countries. Volumes I and II. New York: Academic Press.

Burch, Thomas K. 1966. "The fertility of American Catholics: A comparative overview." Demography 3:174-187.

Caldwell, John C. 1982. Theory of Fertility Decline. New York: Academic Press.

Carlson, Goosta. 1966. "The decline of fertility: Innovation or adjustment process." Population Studies 20:149-174.

Coale, Ansley J. 1974. "Demographic transition reconsidered." Pp. 53-72 in International Population Conference. Liege: IUSSP.

Coale, Ansley J. and James T. Trussell. 1974. "Model fertility schedules: Variations in the age structure of childbearing." Population Index 40:185-258.

Davis, Kingsley. 1945. "The world demographic transition." The Annals of the American Academy of Political and Social Science 237:1-11.

Davis, Kingsley. 1963. "The theory of change and response in modern demographic history." Population Index 29:345-366.

Davis, Kingsley and Judith Blake. 1956. "Social structure and fertility: An analytic framework." Economic Development and Cultural Change 4:211-235.

Day, Lincoln H. 1968. "Natality and ethnocentrism: Some relationships suggested by an analysis of Catholic-Protestant differentials." Population Studies 22:27-50.

Dyson, Tim and Mike Murphy. 1985. "The onset of fertility transition." Population and Development Review 11(3):399-440.

Friedlander, Dov. 1969. "Demographic responses and population change." Demography 6(4):359-381.

Goode, William J. 1970. World Revolutions and Family Patterns. New York: Free Press.

Goldscheider, Calvin. 1971. Population, Modernization, and Social Structure. Boston: Little-Brown and Company.

Goldscheider, Calvin and Peter H. Uhlenberg. 1969. "Minority group status and fertility." American Journal of Sociology 74:361-372.

Gordon, Milton M. 1964. Assimilation in American Life. New York: Oxford Press.

Gusfield, Joseph R. 1967. "Tradition and modernity: Misplaced polarities in the study of social change." American Journal of Sociology 72(4):351-362.

Hajnal, John. 1965. "European marriage patterns in perspective." Pp. 101-143 in D.V. Glass and D.E.C. Eversley (eds.), Population in History. London: Edward Arnold.

Hawthorn, Geoffrey. 1970. The Sociology of Fertility. London: Collier-Macmillan.

Henripin, Jacques and Evelyn Lapierre-Adamcyk. 1974. La Fin de La Revanche Des Berceaux: Qu'en Pensent les Quebecoises? Presses de L'Universite de Montreal.

Hoogvelt, Ankie M.M. 1976. The Sociology of Developing Societies. London: Macmillan.

Inkeles, Alex and D.H. Smith. 1974. Becoming Modern: Individual Change in Six Developing Countries. Cambridge, M.A.: Harvard University Press.

Jiobu, R. and H. Marshal. 1977. "Minority status and family size: A comparison of explanations." Population Studies 31:509-517.

Jones, Elise F. and Charles F. Westoff. 1979. "The end of Catholic fertility." Demography 16(2):209-217.

Johnson, Nan E. and Suwen Lean. 1985. "Relative income, race and fertility." Population Studies 39(1):99-112.

Johnson, Nan E. and Ryoko Nishido. 1980. "Minority-group status and fertility: A study of Japanese and Chinese in Hawaii and California." American Journal of Sociology 86(3):496-511.

Johnson, Nan E. 1979. "Minority-group status and the fertility of black Americans, 1970: A new look." American Journal of Sociology 84:1386-1400.

Kennedy, Robert E. Jr. 1973. "Minority group status and fertility: The Irish." American Sociological Review 38:85-96.

Knodel, John. 1977. "Family limitation and the fertility transition: Evidence from the age pattern of fertility in Europe and Asia." Population Studies 31:219-249.

Kunitz, Steven J. 1981. "Underdevelopment, demographic change, and health care on the Navajo Reservation." Social Science and Medicine 15A:175-192.

Lieberson, Stanley H. 1966. "A societal theory of race and ethnic relations." American Sociological Review 26(6):902-910.

Lopez, D.E. and Georges Sabagh. 1976. "Untangling the structural and normative aspects of the minority-status fertility hypothesis." American Journal of Sociology 83:1491-1497.

Notestein, Frank W. 1944. The Future Population of Europe and the Soviet Union. League of Nations, Geneva.

Ogburn, William F. 1964. On Culture and Social Change. Edited by Otis D. Duncan. Chicago: University of Chicago Press.

Omran, Abdel. 1971. "The epidemiologic transition." Milbank Memorial Fund Quarterly 49: 509-538.

Parsons, Talcot. 1968. The Structure of Social Action. New York: The Free Press.

Petersen, William. 1975. Population. New York: Macmillan.

Piche, V. and M.V. George. 1973. "Estimates of vital rates for the Canadian Indians 1960-1970." Demography 10:367-382.

Potts, Malcolm and Peter Selman. 1979. Society and Fertility. Estover, Plymouth: Macdonald and Evants Ltd.

Rindfuss, Ronald R. 1980. "Minority status and fertility revisited - again: A comment on Johnson." American Journal of Sociology 86(2):372-375.

Ritchey, Neal P. 1975. "The effect of minority group status on fertility: A re-examination of concepts." Population Studies 29:125-138.

Roberts, Robert E. and E.S. Lee. 1974. "Minority group status and fertility: An extension of Goldscheider and Uhlenberg." American Journal of Sociology 76:443-459.

Romaniuc, Anatole. 1985. "Transition from traditional high to modern low fertility: Canadian Aboriginals." Unpublished manuscript. Ottawa: Statistics Canada.

Romaniuc, Anatole. 1984. Fertility in Canada: From Baby Boom to Baby-Bust. Ottawa: Statistics Canada.

Romaniuc, Anatole. 1981. "Increase in natural fertility during the early stages of modernization: Canadian Indians case study." Demography 18(2):157-179.

Romaniuc, Anatole. 1974. "Modernization and fertility: The case of the James Bay Indians." The Canadian Review of Sociology and Anthropology 11(4):344-359.

Rosen, Bernard, C. and Anita L. La Raia. 1972. "Modernity in women: An index of social change in Brazil." Journal of Marriage and the Family 2(2):353-360.

Ryder, Norman B. 1969. "The emergence of a modern fertility pattern: United States, 1917-66." Pp. 99-123 in S.J. Beherman, Leslie Corsa and Ronald Freedman eds., Fertility and Family Planning: A World View. Univeristy of Michigan Press.

Schnaiberg, Allan. 1970. "Rural-urban residence and modernism: A study of Ankar province Turkey." Population Studies 4:270-278.

Singh, Susheela; J.B. Casterline and J.G. Cleland. 1985. "The proximate determinants of fertility: Sub-national variations." Population Studies 39(1):113-135.

Sly, David F. 1970. "Minority group status and fertility." American Journal of Sociology 76:443-459.

Statistics Canada. 1961. Census of Canada. Series 4.1-8, Catalogue 98-508, Volume 4.

Statistics Canada. 1971. Census of Canada; Population: Women Ever Married by Number of Children Ever Born. Catalogue 92-718, Volume 1, Part 2.

Statistics Canada. 1981. Census of Canada; Population: Nuptiality and Fertility. Catalogue 92-906, Volume 1 (National Series).

Thompson, Warren S. 1929. "Recent trends in world population." American Journal of Sociology 34(6):959-975.

Trent, Katherine. 1985. "Parity distribution and socioeconomic development in Mexico: Implications of the effects of subfecundity on the modernization/fertility relationship." Social Biology 31(3-4):208-221.

Trovato, Frank. 1981. "Canadian ethnic fertility." Sociological Focus 14(1):57-74.

Trovato, Frank and T.K. Burch. 1980. "Minority group status and fertility in Canada." Canadian Ethnic Studies 12(3):1-18.

Trovato, Frank and Carl F. Grindstaff. 1980. "Decomposing the urban-rural fertility differential: Canada, 1971." Rural Sociology 45(3):448-468.

Van Heek, Frank. 1956. "Roman Catholicism and fertility in the Netherlands: Demographic aspects of minority status." Population Studies 10:125-138.

Wrong, Dennis. 1977. Population and Society. New York: Random House.

DISCUSSION PAPER SERIES

NO.

33. Rapid Growth and Social Disruption: Health and Well-Being in Ten Communities
John W. Gartrell. July 1983.

34. Socioeconomic Development, Medical Care and Nutrition as Determinants of Infant Mortality in Less Developed Countries
J. Jayachandran and George K. Jarvis, November 1983.

35. Interrelation Between Fertility and Non-Economic Characteristics in India: Results from a Log-Linear Model
P. Krishnan. April 1984.

36. Life Tables by Causes of Death, Canada 1975-1977
V. Cheung, R. Kapoor, E. Ng, N. Lalu, and P. Krishnan. August 1984.

37. Determinants of Fertility in Two Canadian Populations: A Causal Modeling Approach.
J. Jayachandran. December 1984.

38. Mortality Differences Among the Indigenous Populations of French and British Origin, and the Aboriginal Population of Canada, 1950-52 to 1970-72.
Frank Trovato. February 1985.

39. The Relationship Between Migration and the Provincial Divorce Rate in Canada, 1971 and 1978: A Reassessment.
Frank Trovato. February 1985.

40. Interprovincial Migration and Suicide in Canada, 1971 - 1978.
Frank Trovato. May 1985.

41. Economic Status of Immigrant Women at Age 30, Canada, 1981.
Carl F. Grindstaff and Frank Trovato. June 1985.

42. The Effects of Marital Dissolution on Suicide: The Canadian Case.
Frank Trovato. June 1985.

43. Fertility Estimates for Bangladesh Based on Birth History Data.
S.M. Shafiqul Islam, June 1986

44. Reported Masculinity Ratio in Pakistan: A Triumph of Anthropology and Economics over Biology.
Karol J. Krotki, June 1986

45. Model Tables of Working Life.
R. Chow, P. Krishnan, and N.M. Lalu, July 1986